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ABSTRACT

The effect of passage topic and task demands on elementary school students' monitoring of their own comprehension was examined. Second, fourth, and sixth grade students read a short passage about a well-known event (playing checkers) or one about which they had little existing information (making lye soap). Half of the students in each grade were presented with questions about their passage before they read it, while the others saw the questions only after reading. Students in the first condition could consult the questions while reading; all participants could refer to the passage read when answering comprehension questions. Students' spontaneous efforts to engage in either of these behaviors were recorded. Very few participants consulted the questions while reading, although more sixth grade students did so, as did more of the students who read the passage about the unfamiliar event. Significantly more students who read the lye soap story referred to the text when responding to comprehension questions than did students who read the checkers passage. Comprehension of the story about the more familiar situation was better; and sixth grade students answered more questions correctly than did second or fourth grade students. (RL)

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Comprehension Monitoring by Elementary Students: When Does it Occur?

Increasingly, self-regulatory behaviors such as planning, monitoring, revising, and the use of task-appropriate strategies are being identified as critically important for the successful accomplishment of many school-related tasks (Brown & Campione, 1980). With reference to understanding or learning from texts in particular, such behaviors could be viewed as aspects of metacomprehension. Metacomprehension skills include understanding explicit and implicit task demands, identifying important parts of a passage, adjusting attention according to purpose, monitoring ongoing comprehension, identifying and remedying failures in comprehension, and noting inconsistencies and ambiguities in text (Brown, 1980). In general, existing research (e.g., Baker, 1979; Brown & Smiley, 1977, 1978; Markman, in press; Pace, 1978) suggests that these abilities are not manifest consistently until sometime toward the end of the elementary-school years.

However, it would be misleading to conclude that the consistent display of such skills follows a unidirectional developmental pattern. Some behavioral evidence of self-regulatory or planful activity is found even in preschool children (DeLoache & Brown, 1979). Further, metacomprehension is not a unitary phenomenon, but encompasses several kinds of abilities. These may appear at different ages, but they also interact with task demands and situation, so that they may be manifest in some circumstances and not in others. For example, several factors may influence elementary students' comprehension of prose and whether or not they employ appropriate strategies or procedures to enhance their comprehension. These factors would include student attributes, such as degree of cognitive maturity or extent of experience in school; passage characteristics, such as topic or organization and presentation of the content (Levin & Pressley, 1978); and aspects of the interaction between student and passage, such as interest in the topic and purpose for reading.

One aim of the present study was to assess the influence of some of these factors on elementary-grade students' monitoring of their own comprehension, as revealed by their behavior while reading or while attempting to answer questions about the material they had read. In particular, the effects of passage topic and of making task demands or purpose explicit were investigated. An hypothesis was that the perceived difficulty of a passage influences the extent to which children (or adults) attend carefully to what they are reading and make some kind of deliberate effort to check on their understanding. One aspect of difficulty is the unfamiliarity of a topic. Therefore, a passage about a comparatively unknown situation was expected to induce more comprehension monitoring, especially among older elementary-school children, than one about a relatively common event, which would probably appear to be more inherently comprehensible. Further, presenting students with questions before they read the passages might serve to alert them to the specific comprehension demands of the task. The questions would indicate to the students what they were expected to know from their reading. The older students, again, were expected to be more aware of the potential advantage of such information (Brown & Smiley, 1978), and particularly so in the case of the unfamiliar topic. Students for whom these questions were available and who were able to use them to guide their comprehension might also produce more correct responses to these questions than students who did not see the questions prior to reading.

A related purpose of this investigation was to find ways to observe and measure children's comprehension monitoring. Any inferred process which is not available for overt inspection obviously is difficult to study. To overcome this problem, participants in some studies (e.g., Olshavsky, 1976-77) have been asked to report aloud on their reactions and procedures while reading. This approach has a number of limitations. First, requiring students to discuss

what they are doing in the act of doing it interferes with the very process under study. Secondly, such self-reports may not accurately represent the behaviors that have occurred, since these are not necessarily available to conscious awareness or verbalization (DeLoache & Brown, 1979). Also, such reports may not indicate what students normally do in situations where they are not given similar instructions. Therefore, this study attempted to use some behavioral indications of self-regulation. Giving half of the children comprehension questions before they read the assigned passages provided a means of observing whether students consulted the questions as they read, which would be one sign that they were checking their comprehension. Comprehension monitoring can occur during the initial reading of a passage or while attempting to respond to questions about the passage. In the latter case, the questions offer readers a direct means of assessing their own comprehension. They can check on the adequacy of their understanding by consulting the text. Since the passage remained available during questioning, a child who spontaneously referred to the passage while responding would be providing some evidence of comprehension monitoring or self-interrogation. ("Do I know the answer to this question? If not, I'll look in the story to see if I can find it.")

Method

Materials

Two passages, written in narrative style and of approximately 190 words each, were utilized in this study. One passage concerned a topic previously shown (Pace, 1978) to be very well known to children in upper elementary grades -- playing a game of checkers. The other concerned an event such children knew little about -- making lye soap. Both passages are included in Appendix A. A booklet of six typed pages was prepared for each story, with two or three sentences on each page. Eight comprehension questions were written for each story. In addition, 10 words were chosen from the "Checkers" story and 12 from the "Lye Soap" story to be used in pretests to screen for possible word

recognition problems with the passages.

Participants and Procedure

Participants were 24 students each from the second, fourth, and sixth grades of public schools in a medium-sized North Carolina city. They were randomly selected from among those students identified by their teachers as being "average" readers. The second-grade group consisted of 10 boys and 14 girls, with an average age of 8 years, 0 months; the fourth graders included 10 boys and 14 girls, with an average age of 10 years, 2 months; while among the sixth graders were 7 boys and 17 girls, with an average age of 12 years, $1\frac{1}{2}$ months.

Students within each grade were randomly assigned to one of four experimental conditions: a "prequestion" and a "postquestion" condition for each of the two stories. In the "prequestion" condition, six of the eight questions for one of the passages were shown to a participant before the passage was read. In the "postquestion" condition, the same six questions were presented after the student read the passage but before responses to the questions were elicited. Each participant was seen individually in a session which lasted approximately 15 minutes. First, a student was asked to read aloud the list of words from the assigned passage. One second grader who missed more than three words was not included in the study and was replaced with another student in that grade. Other children who made errors in word recognition were told the correct words and then requested to repeat the list correctly; they could all do so. Students who would read the Checkers passage were then asked a few questions about that game. Although some children did not play it often and a few were uncertain what a "king" was, all appeared to be familiar with the basic requirements of the game. Students given the Lye Soap story were first asked if they knew anything about soapmaking. Although a few of them had seen a film or demonstration of the process, no participant revealed any detailed knowledge of the procedure, as anticipated.

Participants in the prequestion condition were then shown the six questions for their assigned topic and asked to read them aloud. They were instructed that they could answer the questions any way they wished and that they could do anything they wanted to help them reply. The major condition was that they try to be as certain as possible of their answers before responding. Next, the students were asked to read the story to themselves. They were allowed to reply to the questions while they read, but most did not do so. Students were observed as they read to see if they consulted the questions. After a participant finished reading the passage, if the questions had not yet been answered, they were repeated one-by-one by the investigator. A similar procedure was followed in the postquestion condition after the student's reading of the required passage. The two additional questions were asked in both conditions as a check on students' awareness of information not previously cued. Children who appeared hesitant or uncertain while responding were asked if they were sure of their answers and, if not, what they could do to check them. Most then replied that they could look back at the story, which they were then permitted to do.

Results

A chi-square test was used to compare the number of children in each grade in the prequestion condition, reading either story, who consulted the questions as they read. Because only a few students overall used the questions in this way, the participants who did not consult the questions were counted in the analysis in order to increase cell frequencies. Even so, the test was not significant, $\chi^2 (2) = 0.339$, $p > .05$. Nevertheless, the results are suggestive. Five students who read the Lye Soap story used the questions while reading, compared to only two students who received the Checkers passage. Likewise, only one second grader and one fourth grader consulted the list of questions, in contrast to five sixth graders who did so.

The number of students in each grade who spontaneously (without prompting) referred to the passage as they answered comprehension questions was compared, using another chi-square test. This test also was not significant, $\chi^2(2) = 1.249$, $p > .05$, even with the use of the Yates' correction (Best, 1981) for small expected cell frequencies. Again, however, the results are in the predicted direction. Only two second graders and two fourth graders, evenly divided between the two stories, exhibited this unprompted behavior, compared to three sixth graders who received the Checkers story and five who read the Lye Soap passage.

To obtain a more sensitive measure of the degree to which students might be monitoring their own responses to questions, a count was made of the number of questions for which each child consulted the text without prompting from the investigator. Since preliminary analyses showed no differential pattern of response for either story between the six questions used in the prequestion condition and the two additional questions, this count was taken over all eight questions. These data were entered into a 3 (grade) x 2 (story) analysis of variance. The main effect for story was significant, $F_{1,66} = 5.81$, $p < .02$. As anticipated, students were much more likely to check their responses to the questions on the Lye Soap passage. Although the grade effect was not significant, results were in the expected direction, since sixth graders spontaneously consulted the text more times than did second or fourth graders. The mean number of checks for each grade and story is shown in Table 1. Because of the number of participants who did not check the text, unprompted, for any question, the distributions in this analysis are positively skewed. However, since each distribution is skewed in the same direction, the analysis is probably robust to violations of the assumption of normality.

Correct responses to each comprehension question were determined by two independent judges in addition to the investigator. Answers were considered

to be correct is they were corrected or amended by the participant without prompting. Responses corrected after prompting by the investigator were tallied separately. Answers read from a story were acceptable if a student had decided on his or her own initiative to respond in this way. Correct replies to all eight questions were compared in a 3 (grade) x 2(story) analysis of variance. Since preliminary analyses had revealed no difference between prequestion and postquestion conditions, scores were combined across conditions. The main effect for grade was significant, $F_{2,66} = 13.03$, $p < .001$; as was the main effect for story, $F_{1,66} = 24.09$, $p < .001$. The interaction between grade and story was not significant. As before (Pace, 1978), the story about a well known situation, playing a game of checkers, was comprehended better, as measured by the questions used, than the passage about an unfamiliar event, making lye soap. The grade effect also replicated that obtained previously by Pace (1978). Post hoc analyses with Tukey's HSD test (Kirk, 1968) showed that the sixth graders answered more questions correctly than did the second and fourth graders, who performed comparably.

Too many students corrected either all or none of their responses to permit a statistical analysis of the proportion of questions corrected after prompting. Overall, however, the pattern mirrors that obtained with other measures, with the sixth graders appearing to do better than the second or fourth graders. Eight of 10 sixth graders corrected all previously inadequate responses, compared with six of 16 second graders and six of 18 fourth graders. No responses were corrected by two of 16 students from the second grade and six of 18 in the fourth grade.

Conclusions

The results of this study overall tend to support its initial predictions. In particular, the topic of a passage was shown to affect whether elementary-school children would employ means to assess their comprehension of that passage.

Students were more likely to check their understanding of a story concerning a little known event than they were when the narrative dealt with a fairly commonplace situation. Apparently, their own knowledge of the more familiar event (playing checkers) was sufficient to permit them to judge the adequacy of their responses to questions about that story. This result is not surprising, but it does suggest that, once available to children, comprehension strategies can be used flexibly and when judged appropriate. Their use should not be expected where they would be superfluous. The difficulty of the passage about a comparatively unknown subject was confirmed separately through the analysis of the correct responses to comprehension questions. Even when elementary-school students had the text of a passage available to them, they could answer more questions correctly when they knew more about what they were reading, a result which provides another example of the powerful influence of existing knowledge on comprehension.

Questions provided before reading apparently were utilized spontaneously by only a few students to guide their comprehension of the assigned story, an observation which may account for the lack of a difference in comprehension scores between the two question conditions. To assist their learning of novel information, students might be trained how to use such questions to monitor their own comprehension when it would be appropriate to do so. This study also supports the utility of seeking behavioral indices of comprehension monitoring, rather than relying exclusively on self-report measures or inferring monitoring from task performance (Baker, 1979; Markman, 1979). Further explorations with such approaches should prove useful in helping to specify the conditions under which readers of different ages will attempt to regulate their ongoing comprehension of texts, as Winograd and Johnston (1980) recommend.

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Table 1

Mean Number of Questions Checked without Prompting by Students in Each Grade

	Story			
Grade	Checkers		Lye Soap	
	M	SD	M	SD
2	0.167	0.577	1.333	1.557
4	0.250	0.622	1.083	2.392
6	0.833	2.329	2.083	2.746
Combined Mean	0.417	1.422	1.500	2.261

APPENDIX A

A Game of Checkers

Pam and Fred were playing a game of checkers. Checkers are little red and black circles that are put on squares or boxes on a checker board. In this game, Pam had the red ones, and Fred had the black ones. It was Pam's turn, and Fred was afraid that she would jump one of his checkers. When you "jump," you take one of the other person's checkers from the board. Pam did jump and took one of Fred's checkers. Then it was Fred's turn. He saw he could jump two of Pam's checkers. He took these two checkers from the board.

But Pam was winning, and she soon got a checker to Fred's end of the checker board. Fred had to make it a king. A "king" can move in any direction and jump other kings. Soon Pam had four kings and Fred had two. You win this game if you take all the other person's checkers from the board or if that person cannot move any checker. In a few minutes, Pam had won the game. She had taken all Fred's checkers from the board.

Making Lye Soap

Mr. and Mrs. Green like to make their own soap from grease and lye. The Greens make the lye from the ashes of trees like maple or white oak. First, Mr. Green puts the wood ashes in something called as ash hopper. Then he pours water into the hopper. The water runs over the ashes and drips out the bottom of the hopper into a pan. Mr. Green keeps pouring this ashy water over the ashes. When Mr. Green has done this many times, the water becomes lye.

After the lye is made, Mrs. Green puts it and the grease into a big pot and mixes them together. She heats this mixture over a fire for thirty minutes. She keeps stirring it while it is cooking. When it has cooked long enough, Mr. Green helps Mrs. Green pour this mixture into a large, flat pan. The mixture will be soap when it cools and becomes hard, so the Greens let it cool in the pan overnight. After the soap is cool and hard, the Greens cut it into little bars. It is then ready to use for washing.